CALIFORNIA INSTITUTE OF TECHNOLOGY
PASADENA 4

GATES AND CRELLIN LABORATORIES OF CHEMISTRY

July 19, 1952

TO: Professor G. W. Beadle

FROM: J. H. Sturdivant

SUBJECT: Space requirements

I estimate below the gross space which is needed to care adequately for certain existing activities in chemistry which are related to medicine or biology. In most cases these activities need double the space now available to them, even without expansion of the research programs. If they can be given the space they need in a new building, that which they free in Gates and Crellin can be used to great advantage by other existing activities.

The various needs for space are taken up in order of decreasing urgency.

1. The immunochemistry group directed by Professors Linus Pauling and D. H. Campbell is most inadequately housed at present. The group program includes investigations of hemoglobin in relation to disease in human beings; of oxypolygelatin, a plasma extender developed by the group; and of allergy, the processes of sensitization, and the nature of antigen-antibody reactions. A wide variety of chemical and physical instrumental methods must be employed, including electron microscopy, analysis in the ultracentrifuge, electrophoresis, ultrasonics, light scattering, radioactive tracer techinques, and magnetic methods; consequently the demands for space are especially heavy. The group now occupies 7400 sq. ft. in Gates and Crellin; they need 15,000 sq. ft.

2. Professor Pauling, who should have office and laboratory space near the immunochemistry group and related groups, occupies 1000 sq. ft. in Crellin, and needs 1500 sq. ft.

3. The small analytical and preparative group headed by Dr. Schroeder, and directed generally by Professor Corey, concerns itself with the problem of determining the order of amino acid residues in a polypeptide chain. They are now attempting the analysis of gelatin, a protein of great medical and physiological importance. This program complements from the fundamental side the more practical studies of gelatin and modified gelatins as plasma extenders. If successful it will also furnish the basic information necessary before a detailed determination of the structure of the gelatin molecule by x-ray diffraction can be attempted.

This group, one which is only a few years old, is hampered by the limited space available, 1250 sq. ft.; they need 3000 sq. ft.

4. Professor Niemann heads a large group which is carrying out a penetrating study of the nature of enzymes and the mechanism of their action in relation to their structure, especially the enzymes which degrade proteins into amino acids in the animal body. This group occupies 3000 sq. ft., and could use effectively 4500 sq. ft.

5. The large x-ray diffraction group headed by Professor Pauling and Professor Corey began about 16 years ago a long-range attack on the problem of the structure of proteins. Much of the groundwork has been completed; the interatomic distances, bond angles, and other structural features in many amino acids and polypeptides have been measured. A number of acceptable ways of coiling the polypeptide chain have been proposed, and now detailed comparisons of the proposed models with the evidence from diffraction studies are under way. This group occupies 6000 sq. ft. It needs 12,000 sq. ft.

6. To serve the five groups above a variety of special utility rooms would be necessary, such as balance rooms, dark rooms, spectrophotometric laboratories, a calculating room, a seminar room, etc. Roughly 2000 sq. ft. would be needed here.

The foregoing space requirements are tabulated below.

1.	Immunochemistry	15,000 sq. ft.
2.	Professor Pauling	1,500
3.	Protein analysis	3,000
4.	Enzyme chemistry	4,500
5.	X-ray molecular structure	12,000
6.	General	2,000
	Total	38,000 sq. ft. gross

As I have told you, these are not quite all of the pressing needs for space for chemistry.

Three proposals for a new chemistry building have been prepared in recent years with the advice of Mr. Hertenstein. I believe that the following costs for space for chemical activities, with quality and facilities equal to Crellin Laboratory to-day, are realistic. Each item should be multiplied by the gross area occupied.

For construction, including architects' fees, lighting, ventilation, and utilities	$25 per sq. ft.
For chemical furniture, including fume hoods, chemical desks, and reagent shelves	6 per sq. ft.
For office furniture	1 per sq. ft.
For mechanical assistance in moving and installing apparatus and facilities, and for materials of installation	1 per sq. ft.
Total	$33 per sq. ft.

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